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PROPOSED SUBSURFACE SOIL INVESTIGATION SECONDARY CONTAINMENT STRUCTURE A-1-ZF, PLANT A-1

LOCKHEED–CALIFORNIA COMPANY
BURBANK, CALIFORNIA

SUBMITTED
TO
CALIFORNIA REGIONAL WATER
QUALITY CONTROL BOARD
LOS ANGELES REGION

FROM
LOCKHEED–CALIFORNIA COMPANY
BURBANK, CALIFORNIA 91520

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ENVIRONMENTAL CONTROL SPECIALIST
LOCKHEED–CALIFORNIA COMPANY

APRIL 24, 1986

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PROPOSED SUBSURFACE SOIL INVESTIGATION, SECONDARY CONTAINMENT STRUCTURE A-1-ZF, PLANT A-1

INTRODUCTION

During the underground tank leak detection investigation conducted at Lockheed-California Company, (CALAC) the California Regional Water Quality Control Board (RWQCB) requested, in a letter dated October 3, 1984 to Mr. R. L Miland of CALAC, that additional subsurface soil testing be performed, when the inactive metal cleaning and plating facilities located in Building 68 and 69 were removed.

This proposed work plan describes the method of drilling, sampling, analysis and scheduling for the subsurface soil investigation, at the former above-ground secondary containment structure A-1-ZF.

A-1-ZF was an above ground secondary containment structure beneath 16 large process dip tanks. These tanks, emptied in the fall of 1984, had contained sodium hydroxide, deionized water, surfactants, sodium bicarbonate, two different chromium solutions (sodium dichromate and chromium trioxide), sulfuric acid and for a very brief period, nitric acid. Using this information as the base line, the soils will be analyzed for pH, total chromium and sulfates.

OVERVIEW OF PROGRAM APPROACH

This proposed work plan was organized using two separate reports:

1. "Results of Investigation Secondary Containment Structure A-1-ZF, Plant A-1", submitted to the RWQCB dated February 1, 1985.

2. "Results of Concrete Coring and Laboratory Analyses of Concrete Slab Beneath Above Ground Dip Tanks", Prepared by Gregg and Associates, Inc., dated January 13, 1986 (See Appendix (1)).

The first (1) report was requested by the RWQCB as a supplement to the Underground Tank Leak Detection Program, and resulted with the installation of nine (9) suction lysimeters to monitor subsurface conditions at the overspill collar A-1-ZF. This facility was not included in the initial UGT Program because it was an above ground installation. Subsequent discussions with Mr. Al Novak, of the RWQCB, however, concluded that, because of the facilities structures, it too should be included in a supplemental monitoring program.

The locations of the suction lysimeters are shown on the site map contained in the aforementioned (1.) report.

The second (2.) report was generated as a result of the actual demolition and subsequent disposal of the above ground process dip tanks, and the concrete slabs underlying the tanks. The floor slab was part of an above ground secondary containment structure. The concrete floor slab beneath the tanks exhibited localized areas of degradation and yellow and green-yellow staining, indicative of possible chromium contamination. It was necessary to establish the concentrations of chromium to enable us to determine the class of disposal site for the disposal of the concrete debris. To assess the concentrations and extent of possible chromium contamination in the concrete floor, CALAC retained Gregg and Associates Inc., to conduct a concrete coring program to obtain concrete samples for laboratory analysis. The results of the testing assessed the extent of the chromium contamination, and aided CALAC in determining a suitable disposal site. The locations and number of the concrete core samples were determined by Mr. Terry Carberry of CALAC, based on his twenty years experience in the field of chemistry and these process dip tanks.

Nineteen sites were selected (C-1 through C-19) for the concrete core locations and one concrete slab, grab sample (in lieu of C-15) as seen on Figure (1) in Appendix (1).

All concrete samples were analyzed for chromium TTLC using EPA method 200.7 EPA method 3050 was used to prepare the sample. If the chromium concentration of a sample exceeded 560 mg/kg by TTLC and was less than 2500 mg/kg TTLC, it was then analyzed for chromium STLC using the

bottom of the hole by a wire line. A modified California sampler is [illegible] reached and a soil sample is to be collected.

On the 20 foot borings, samples will be collected at approximate depths of 5, 10, 15 and 20 feet below land surface. The 40 foot boring, samples will be collected at approximate depth of 5, 10, 15, 20, 25, 30, 35 and 40 feet as stated in California Administrative Code Title 23 Waters Subchapter 16, Article 4, Section 2645(c).

The modified California sampler consists of an outer barrel and an inner set of rings. The steel outer barrel is about 3,200 inches outside diameter. The brass or stainless steel inner rings are 2,500 inches outside diameter and 2,375 inches inside diameter, and are 6.00 inches in length. The bottom of the sampler is driven through and ahead of the hollow stem auger flights and the soil sample is collected in the two 6.00 inch rings.

Upon bringing the soil sampler containing the soil to the surface, the outer barrel of the sampler will immediately be opened and the two rings will be removed. The lower 6.00 inch inner ring, will be quickly sealed at both ends with aluminum foil, capped with plastic end caps, secured by duct tape, labeled and placed in an ice chest containing "blue ice". A chain of custody manifest will accompany all samples. This is in accordance to the U.S. Environmental Protection Agency and the State Water Quality Control Board Guidelines for preserving and storing samples for shipment to a chemical laboratory.

The soil in the upper 6.00 inch rings will be used for lithologic examination and description and will be placed in a zip lock plastic bag and sealed and archived.

The purpose of the archived sample is, that if for any reason there are inconsistencies in laboratory analysis or lithologic conditions, soil samples can be obtained without the need of additional borings.

Before the modified California sampler and rings are assembled and inserted in the bore hole, they will be cleansed to avoid cross contamination between samples. The equipment will be washed with soap and water, rinsed with tap water, dipped in hexane or methanol, rinsed with distilled or deionized water and allowed to air dry.

The auger flights will be steam cleaned prior to arrival at the site and between each bore hole if visual examination of the soil in the vadose zone shows any signs of contamination.

Upon completion of the bore hole and sampling and because the depth to ground water is greater than 40 feet, the bore hole will be completed in the vadose zone. The bore hole will be allowed to cave in, then will be filled with a clean sand pack such as Lone Star No. 3 size sand. The sand pack will be placed to a point about 6 inches below landsurface. The remainder of the hole will be sealed with bentonite clay pellets, and a 4 inch concrete cap.

DRILL BORINGS LOCATIONS

Six borings will be drilled to collect soil samples, five (5) twenty foot borings and one (1) forty foot boring, for laboratory analyses to assist in assessing the vertical and lateral extent of soil contamination, if any. Tentative boring locations are based on the previously described, concrete coring program and subsurface soil exploration around the perimeter of the former above ground secondary contamination structure.

Figure (1) shows the proposed or tentative boring locations. A geological engineer will be on site to supervise drilling, to make a lithologic logs of drill cuttings, and to make observations of contamination.

The first twenty foot boring, will be located just east and slightly south of sump A-1-A. The reason for this boring is to provide information as to whether the 102 mg/kg of total chromium was caused by sump A-1-A leaking or the contamination was, in fact, caused by leaks in the A-1-ZF secondary containment structure.

The second through the fifth twenty foot borings will be located in the areas of high levels of chromium contamination, as shown on Figure 1, Appendix (1), between C-19 and C-20, C-11 and C-12, east of C-04 and approximately twenty five feet east of C-18 respectively.

The deep boring will be located in the area of C-08 of Figure (1) Appendix (1), to verify if the total chromium attenuates with depth. It is very unlikely that the chromium compounds penetrated the twenty-two inches of solid concrete that formed the secondary containment structure beneath the sulfuric acid anodizing facilities. This was the logic used to locate a deep boring by C-08 rather than at C-20 where the concrete coring sample contained 11,100 mg/kg of total chromium. Also considered was the fact that the subconcrete floor beneath the eighteen inches of concrete, showed no signs of discoloration or salt precipitation that is evident on the sub floor beneath the chemical conversion coating process tanks.

TASK 2 - LABORATORY ANALYSIS

The depth-specific soil samples will be analyzed for chromium, sulfate and pH. All samples will be analyzed for chromium using inductively coupled plasma-atomic emission spectrometric method-EPA method 200.7 with an EPA method 3050 preparation. Additionally 12 samples will be analyzed for soluble chromium using the method specified in Title 22, Division 4, Chapter 30, Article 11, Section 66700.

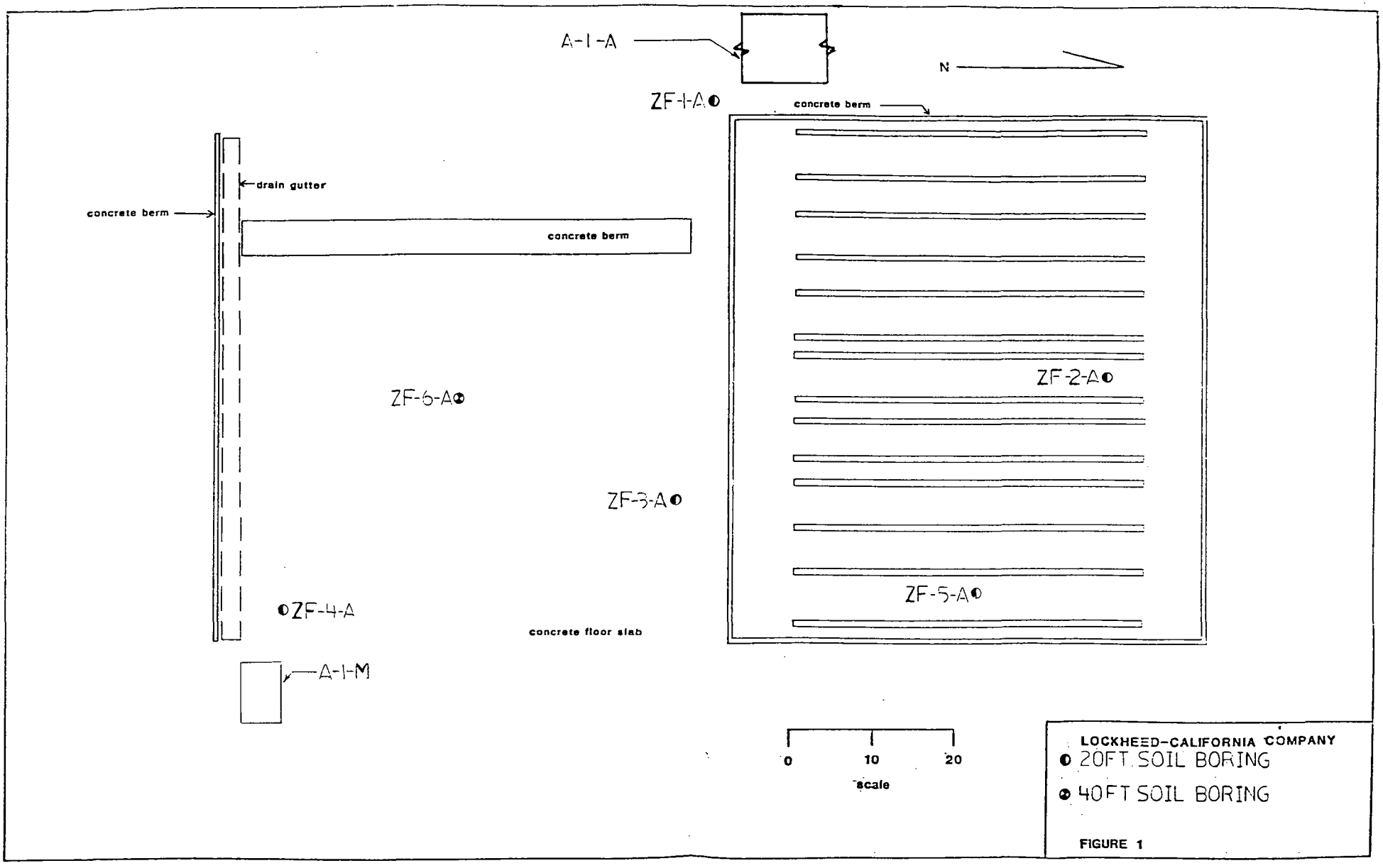
TASK 3 - FINAL REPORT

The results of tasks 1 and 2 will be incorporated into a report and submitted to the California Regional Water Quality Control Board. The report will document all information and findings and will present recommendations and conclusions for additional work if necessary.

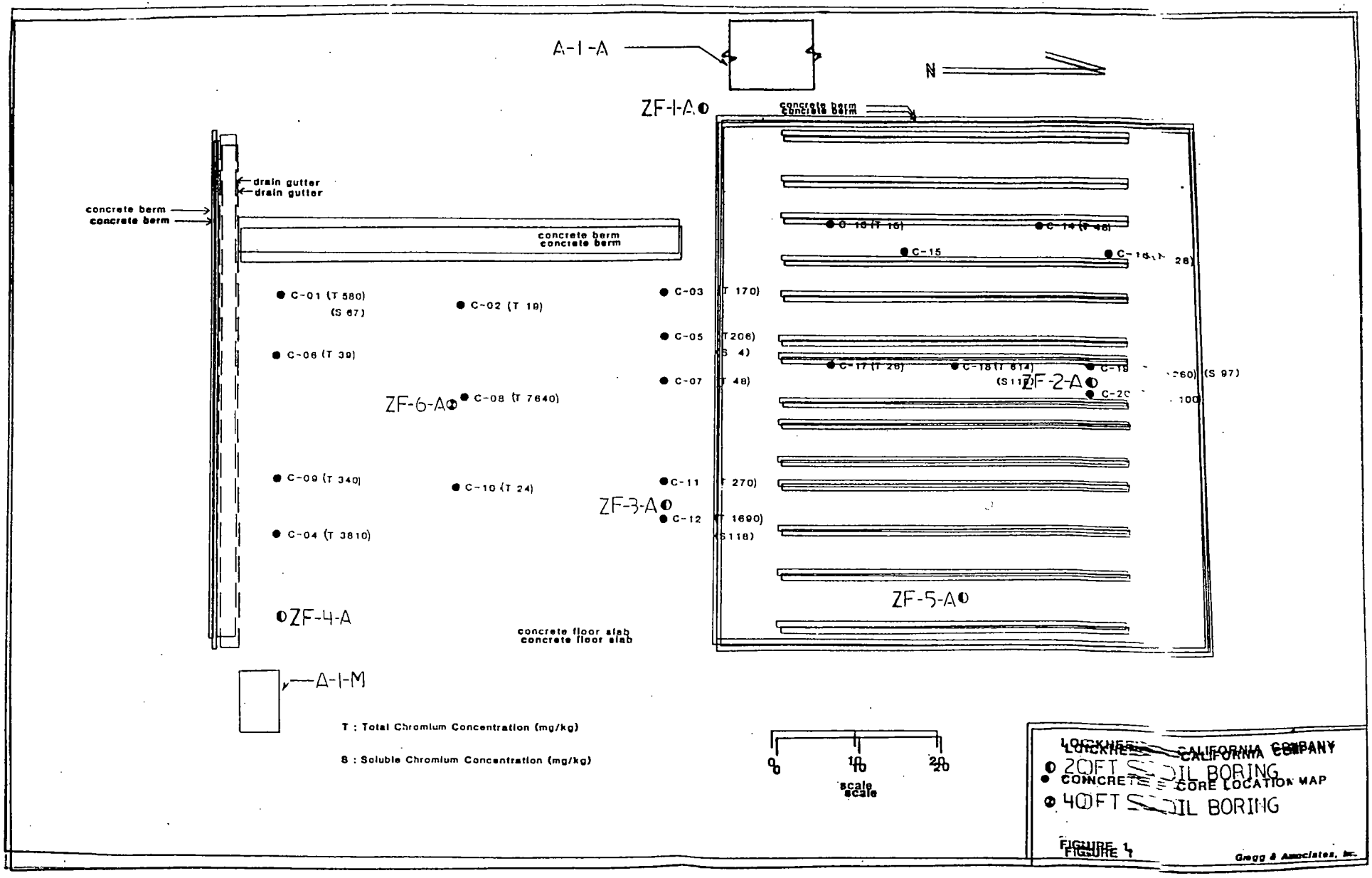
SCHEDULE

CALAC is prepared to commence task 1 and 2 the first quarter of 1987 with task 3 following approximately 4 weeks thereafter.

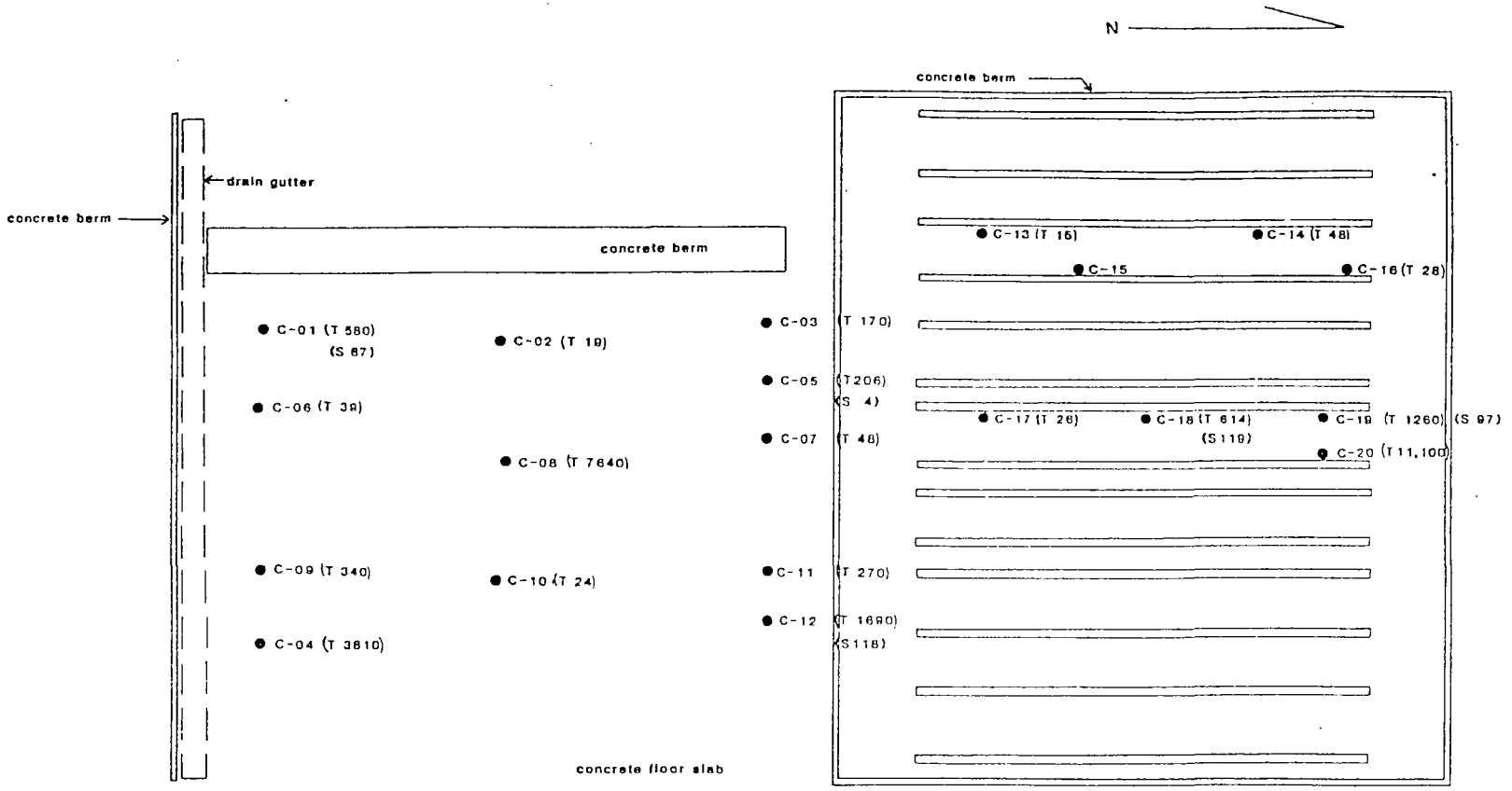
FIGURE 1


A-1-A
N
ZF-1-A
concrete berm
drain gutter
concrete berm
concrete berm
ZF-6-A
ZF-2-A
ZF-3-A
ZF-5-A
ZF-4-A
concrete floor slab
A-1-M
0
10
20
scale
LOCKHEED-CALIFORNIA COMPANY
20FT SOIL BORING
40FT SOIL BORING
FIGURE 1

12520


A-1-A
N
ZF-1-A
concrete berm
concrete berm
drain gutter
drain gutter
concrete berm
concrete berm
concrete berm
concrete berm
C-01 (T 580)
(S 67)
C-02 (T 19)
C-03 (T 170)
C-05 (T 206)
(S 4)
C-06 (T 39)
C-07 (T 48)
ZF-6-A
C-08 (T 7640)
C-09 (T 340)
C-10 (T 24)
C-11 (T 270)
ZF-3-A
C-12 (T 1690)
(S 118)
C-04 (T 3810)
ZF-4-A
concrete floor slab
concrete floor slab
C-15
C-17 (T 26)
C-18 (T 614)
(S 112)
ZF-2-A
(S 97)
ZF-5-A
A-1-M
T : Total Chromium Concentration (mg/kg)
S : Soluble Chromium Concentration (mg/kg)
0
10
20
scale
scale
LOCKHEED CALIFORNIA COMPANY
20FT SOIL BORING
CONCRETE CORE LOCATION MAP
40FT SOIL BORING
FIGURE 1
FIGURE 1
Gregg & Associates, Inc.

2520



T : Total Chromium Concentration (mg/kg)

S : Soluble Chromium Concentration (mg/kg)

0 10 20

scale

LOCKHEED-CALIFORNIA COMPANY

● CONCRETE CORE LOCATION MAP

FIGURE 1

Gregg & Associates, Inc.

2520

APPENDIX 1

RESULTS OF CONCRETE CORING AND LABORATORY ANALYSES OF CONCRETE SLAB BENEATH ABOVE GROUND DIP TANKS, LOCKHEED-CALIFORNIA BUILDING 68, PLANT A-1

SUBMITTED TO
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JANUARY 13, 1986

CONTENTS

1.0 Introduction

Lockheed-California Company (CALAC) recently removed a series of above-ground dip tanks from building 68 at Plant A-1 in Burbank, California. As part of the tank removal process the concrete slab underlying the tanks will also be removed. This floor slab was part of an above ground secondary containment structure. The concrete floor slab beneath the tanks exhibited localized areas of degradation and yellow and green-yellow staining, indicative of possible chromium contamination. It is necessary to establish the concentrations of chromium to enable CALAC to select waste disposal sites for the disposal of the concrete debris. The California Department of Health Services considers a material as hazardous if the chromium TTLC (Total Threshold Limit Concentration) exceeds 2500 mg/kg or if the chromium STLC (Soluble Threshold Limit Concentration) exceeds 560 mg/kg.

To assess the concentrations and extent of possible chromium contamination in the concrete floor, CALAC retained Gregg & Associates, Inc., to conduct a concrete coring program to obtain concrete samples for laboratory analysis. The results of the testing will assess the extent of the chromium contamination. This report describes the coring program and the results of the laboratory analyses.

2.0 Scope of Work

On January 6, 1986, twenty concrete cores were collected from the floor slab (see Figure 1). In addition, one grab sample was collected from a piece of concrete debris left on the floor from

the dip tank removal. The locations for collecting the core samples were determined by Mr. Terry Carberry of CALAC. The concrete coring was performed by the Concrete Coring Company, of Paramount, California. The cores were drilled with a diamond core drill. Twelve of the cores (C-1 through C-12) were drilled through the floor slab and varied in length from 3.5 to 5 inches. The other eight cores (C-13 through C-20) were drilled in an 18 inch thick concrete slab poured on top of the original floor slab. These cores were drilled to a depth of 12 inches.

After a core was drilled, it was placed in a zip lock plastic bag and labeled. Each core was visually inspected and the color and depth of penetration of any staining was noted (see Appendix). The cores were then placed in an ice chest and delivered by Gregg & Associates, Inc., to Analytical Technologies, Inc. (ATI), of National City, California, for analyses.

3.0 Laboratory Analyses

Nineteen concrete core samples and the one concrete grab sample were delivered to ATI on the morning of January 7, 1986. The concrete grab sample was substituted for one of the concrete core samples (C-15) at the request of Mr. Terry Carberry of CALAC. The concrete grab sample was collected for analyses to establish the concentrations of chromium in concrete debris left on the floor after the dip tank removal. Sample C-15 was selected to be omitted as it was taken near Samples C-13 and C-14. Further, the depth of penetration of chromium staining was similar to samples C-13 and C-14. Therefore the chromium values in C-13 and C-14

should be representative of C-15.

All concrete samples were analyzed for chromium TTLC using EPA Method 200.7. EPA Method 3050 was used to prepare the sample. If the chromium concentration of a sample exceeded 560 mg/kg by TTLC and was less than 2500 mg/kg TTLC, it was then analyzed for chromium STLC using the method specified in Title 22, Division 4, Chapter 30, Article 11, section 66700 for soluble chromium analysis. The results of the laboratory analyses are shown in Tables 1 and 2.

TABLE 1

RESULTS OF CHROMIUM TTLC ANALYSES

SAMPLE	CHROMIUM TTLC (mg/kg)	SAMPLE	CHROMIUM TTLC (mg/kg)
C-1	580	C-11	270
C-2	18.8	C-12	1690
C-3	170	C-13	14.7
C-4	3810	C-14	48.1
C-5	206	C-16	28.4
C-6	39.4	C-17	25.9
C-7	47.6	C-18	614
C-8	7640	C-19	1260
C-9	340	C-20	11,100
C-10	23.5	*C-A	10,500

* C-A - concrete grab sample

TABLE 2

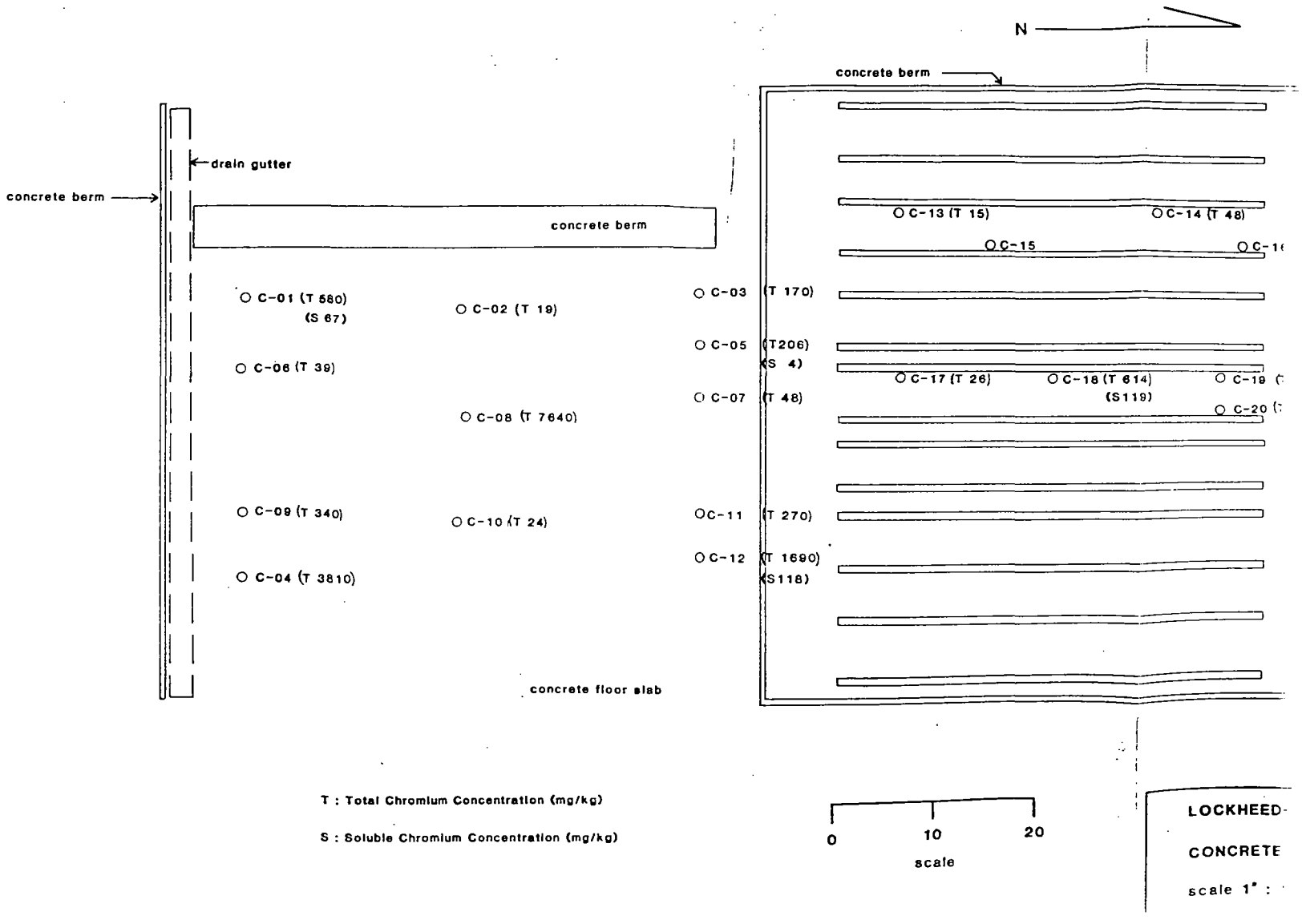
RESULTS OF CHROMIUM STLC

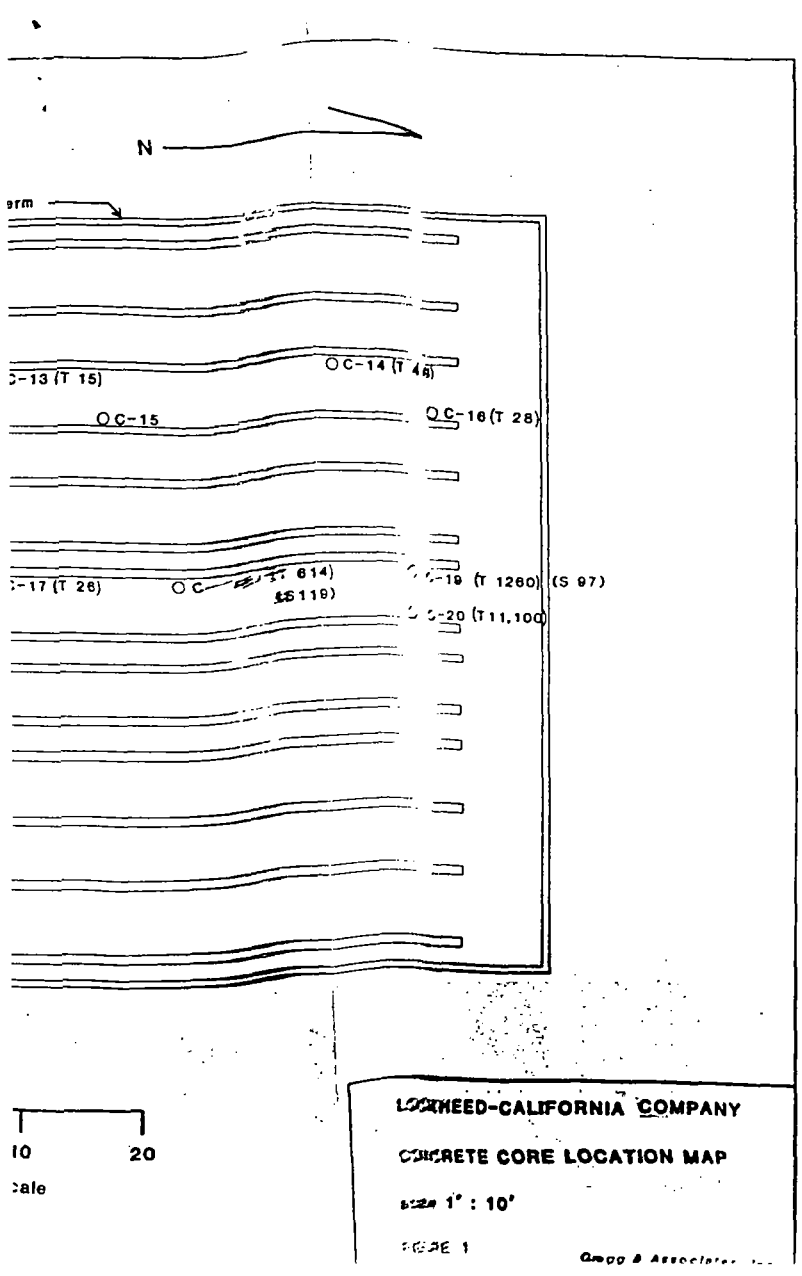
SAMPLE	CHROMIUM STLC (mg/kg)
C-01	66.5
C-05	3.7
C-12	118
C-18	119
C-19	97

The concentrations of chromium (TTLC and STLC) in the core samples are plotted on Figure 1.

4.0 Findings/Conclusions

The results of the laboratory analyses indicate that chromium concentrations in localized areas of the floor slab exceeds the TTLC and/or STLC limits established by the California Department of Health Services for classification as a hazardous waste. The depth of penetration of chromium staining visually observed in the core samples (See Appendix) correlated with the laboratory results. That is, the greater the depth of penetration of chromium staining, the higher the concentrations of chromium in the sample. In concrete cores that were stained throughout the entire length, the chromium concentrations exceeded the total threshold limit concentration. In core samples where the depth of penetration of chromium staining was limited to only the upper 0 to 1 inch, the chromium concentrations were typically well below the total threshold limit concentration.


N
concrete berm
drain gutter
concrete berm
concrete berm
C-01 (T 580)
(S 67)
C-02 (T 19)
C-03 (T 170)
C-05 (T206)
(S 4)
C-06 (T 38)
C-07 (T 48)
C-08 (T 7640)
C-09 (T 340)
C-10 (T 24)
C-11 (T 270)
C-12 (T 1690)
(S118)
C-04 (T 3810)
concrete floor slab
C-13 (T 15)
C-14 (T 48)
C-15
C-17 (T 26)
C-18 (T 614)
(S119)
C-20
T : Total Chromium Concentration (mg/kg)
S : Soluble Chromium Concentration (mg/kg)
0
10
20
scale
LOCKHEED-
CONCRETE
scale 1" :



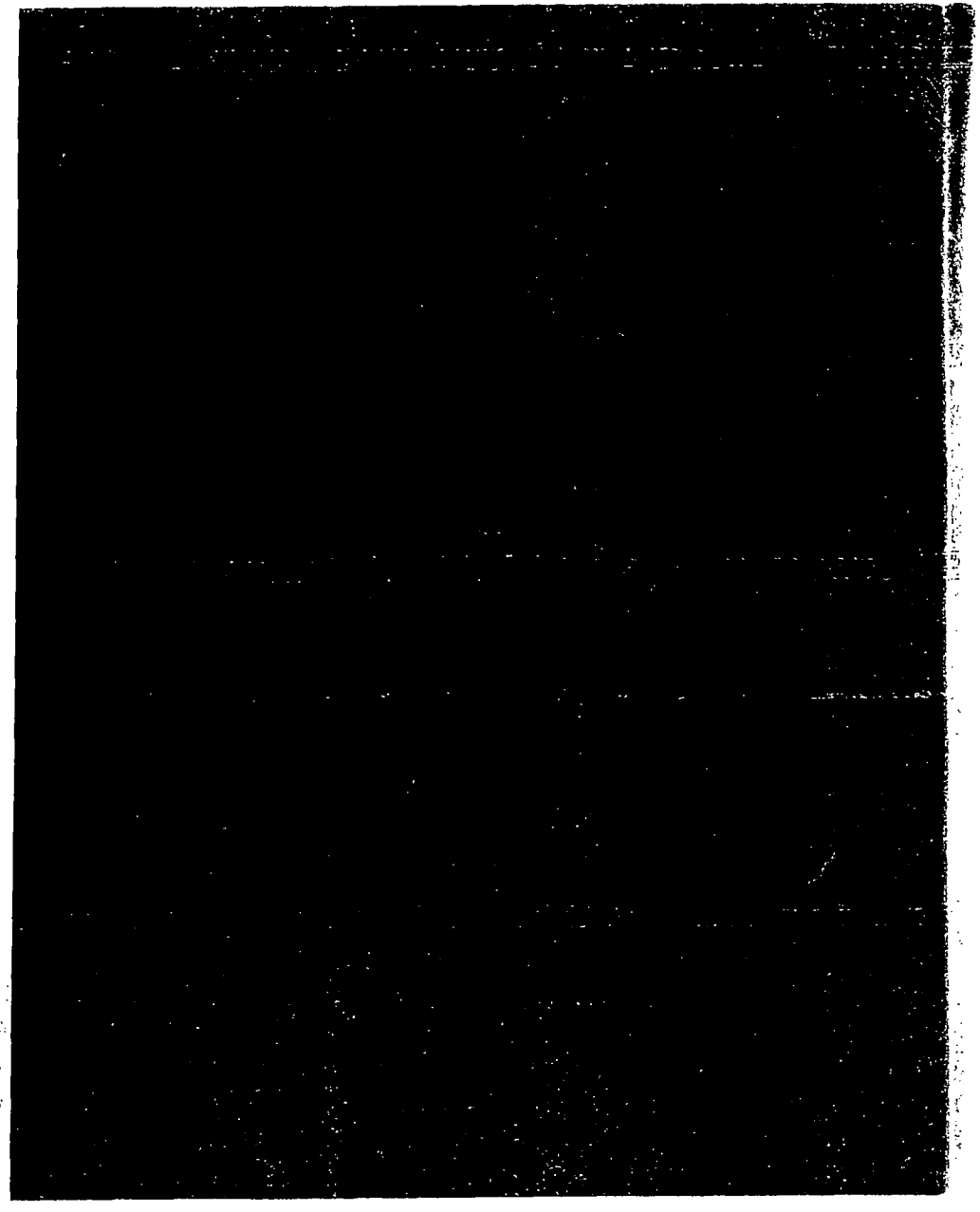
LOCKHEED-CALIFORNIA COMPANY

CONCRETE CORE LOCATION MAP

SCALE 1" : 10'

FIGURE 1

Gregg & Associates, Inc.



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APPENDIX

CONCRETE CORE - VISUAL OBSERVATIONS

SAMPLE	COMMENTS
C-01	light red stain 0 - 0.5 inches from top of core
C-02	light stain 0 - 0.25 inches from top of core
C-03	light stain 0 - 0.25 inches from top of core
C-04	light green entire length of core, green precipitate on bottom of core
C-05	light red stain 0 - 0.25 inches from top of core
C-06	light red-pink stain 0 - 0.75 inches from top of core
C-07	light red-pink stain 0 - 0.75 inches from top of core
C-08	light green entire length of core, very green on bottom of core
C-09	light green entire length of core, very green on bottom of core
C-10	light green entire length of core
C-11	light red 0 - 0.25 inches from top of core
C-12	light green entire length of core
C-13	no apparent staining
C-14	dark red-green stain 0 - 0.25 inches from top of core
C-15	dark red-green stain 0 - 0.25 inches from top of core
C-16	dark red-green stain 0 - 0.25 inches from top of core
C-17	dark red-green stain 0 - 0.25 inches from top of core, light green stain next 0.75 inches
C-18	dark red- green stain 0 - 0.25 inches from top of core, light green stain next 0.75 inches
C-19	red stain 0 - 0.25 inches from top of core, light green next 10 inches
C-20	light green entire length, darker green top 3 inches
C-A	light green stain throughout